face reaction of H_2O on Ru, and for the Pt-CeO_2/CB anode is the diffusion of the active species on the Pt-CeO_2 particles. These findings led the research team to infer that using nanosized CeO_2 particles has the potential to increase the performance of the Pt-CeO_2/CB anode even more, making it possible to reduce the amount of Pt needed in the electrode.

SIARI S. SOSA

Bioactive Glass Scaffolds with Hierarchical Pore Networks Fabricated

Mesoscopic bioactive glasses have been reported to have excellent bone-forming bioactivities, but are ineffective as tissue scaffolds. The pore dimensions are too small to promote cell seeding and migration necessary for tissue regeneration. Researchers from Korea Institute of Machinery & Materials (KIMM) addressed these concerns in the March 16 issue of *Chemical Communications* (DOI: 10.1039/b702103h). H.-S. Yun and co-workers at KIMM reported on the design and fabrication of three-dimensional bioactive glass scaffolds with hierarchical pore networks and bone–tissue regeneration capabilities.

The fabrication protocol is a combination of sol-gel synthesis, polymer templating, and rapid prototyping using a robotic deposition mechanism. A virtual 3D scaffold architecture was generated by computer-aided design and interpreted by the robotic deposition device for fabrication using a gel paste. In addition to inorganic precursors, the gel paste uses a triblock copolymer ($EO_{100}PO_{65}EO_{100}$ (F127)) as a mesostructure directing agent and methyl cellulose (MC) as a macrostructure directing agent and binder. Extrusion of the gel paste onto a heated (60–100°C) substrate yields a stable gel structure following quick solvent evaporation and solidification of MC. The size, thickness, pore dimensions, and number of stacking layers in the scaffold can be easily manipulated by computer control. After aging for 24 h at 40°C, calcination of the organic–inorganic hybrid removes the polymer template. As a result, 3D pore networks with hierarchically giant- (>100 μm), macro- (10 μm < d_{pore} < 100 μm), and mesopores are generated in the scaffold. No apparent structural deformation was observed after calcination although there was an ~35% decrease in scaffold size.

In vitro bioactivity of the 3D porous scaffolds were tested in simulated body fluid (SBF) at 37°C. Formation of hydroxyl apatite on the porous surface was monitored by acquiring and comparing scanning electron microscopy images before and after interaction with SBF. Within 24 hours, formation of biomimetic hydroxyl apatite confirmed excellent bone-forming bioactive capabilities *in vitro*.

Although this simple and reproducible synthetic method was directed toward biomimetic applications, the researchers said that it could be very easily adapted for various hierarchical porous structures with potential applications in optics, sensing, and catalysis.

SOMA CHATTOPADHYAY

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